Appendix E

Paleontological Assessment

PALEONTOLOGICAL ASSESSMENT FOR THE DEXTER VILLAGE PROJECT

LAKE ELSINORE, RIVERSIDE COUNTY, CALIFORNIA

PAR 2022-07; APNs 377-090-013, -037, -039, and -040

Prepared for:

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2280 Wardlow Circle, Suite 250
Corona, California 92878

Submitted to:

City of Lake Elsinore
Community Development Department
Planning Division
130 South Main Street
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June 22, 2022; Revised July 20, 2023;
Revised June 19, 2024; Revised April 11, 2025

BFSA Environmental Services
A Perennial Company

Paleontological Database Information

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Report Title:	Paleontological Assessment for the Dexter Village Project, Lake Elsinore, Riverside County, California (PAR 2022-07; APNs 377-090-013, -037, -039, and -040)
Prepared for:	Fairbrook Communities 2280 Wardlow Circle, Suite 250 Corona, California 92878
Submitted to:	City of Lake Elsinore Community Development Department Planning Division 130 South Main Street Lake Elsinore, California 92530
Prepared by:	BFSA Environmental Services, a Perennial Company 14010 Poway Road, Suite A Poway, California 92064
USGS Quadrangle:	Section 31, Township 5 South, Range 4 West, USGS (7.5-minute) *Lake Elsinore, California* topographic quadrangle map
Study Area:	22.5 acres
Key Words:	Paleontological assessment; Holocene; Pleistocene; young alluvial-fan deposits; high sensitivity; full-time monitoring; City of Lake Elsinore.

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I. INTRODUCTION AND LOCATION

A paleontological resource assessment has been completed for the Dexter Village Project located along the east side of Dexter Avenue, between 2nd and 3rd streets, in the city of Lake Elsinore, Riverside County, California (Figures 1 and 2). The project consists of four parcels (Assessor's Parcel Numbers [APNs] 377-090-013, -037, -039, and -040) totaling 22.5 acres. On the U.S. Geological Survey (USGS) (7.5-minute) 1:24,000-scale *Lake Elsinore, California* topographic quadrangle map, the project is situated in Section 31, Township 5 South, Range 4 West of the San Bernardino Baseline and Meridian (see Figure 2). The project proposes a mixed-use development consisting of a multi-family residential apartment complex, recreation center, and associated infrastructure.

As the lead agency, the City of Lake Elsinore has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources (PAR 2022-07). The paleontological assessment of the project included a review of paleontological literature and fossil locality records in the area; a review of the underlying geology; and recommendations to mitigate impacts to potential paleontological resources, if necessary.

II. REGULATORY SETTING

The California Environmental Quality Act (CEQA), which is patterned after the National Environmental Policy Act, is the overriding environmental regulation that sets the requirement for protecting California's paleontological resources. CEQA mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

State of California

Under "Guidelines for Implementation of the California Environmental Quality Act," as amended in December 2018 (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Sections 15000 et seq.), procedures define the types of activities, persons, and public agencies required to comply with CEQA. Section 15063 of the CCR provides a process by which a lead agency may review a project's potential impact to the environment, whether the impacts are significant, and provide recommendations, if necessary.

In CEQA's Environmental Checklist Form, one of the questions to answer is, "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (Appendix G, Section VII, Part f). This is to ensure compliance with California Public Resources Code Section 5097.5, the law that protects nonrenewable resources, including fossils, which is paraphrased below:

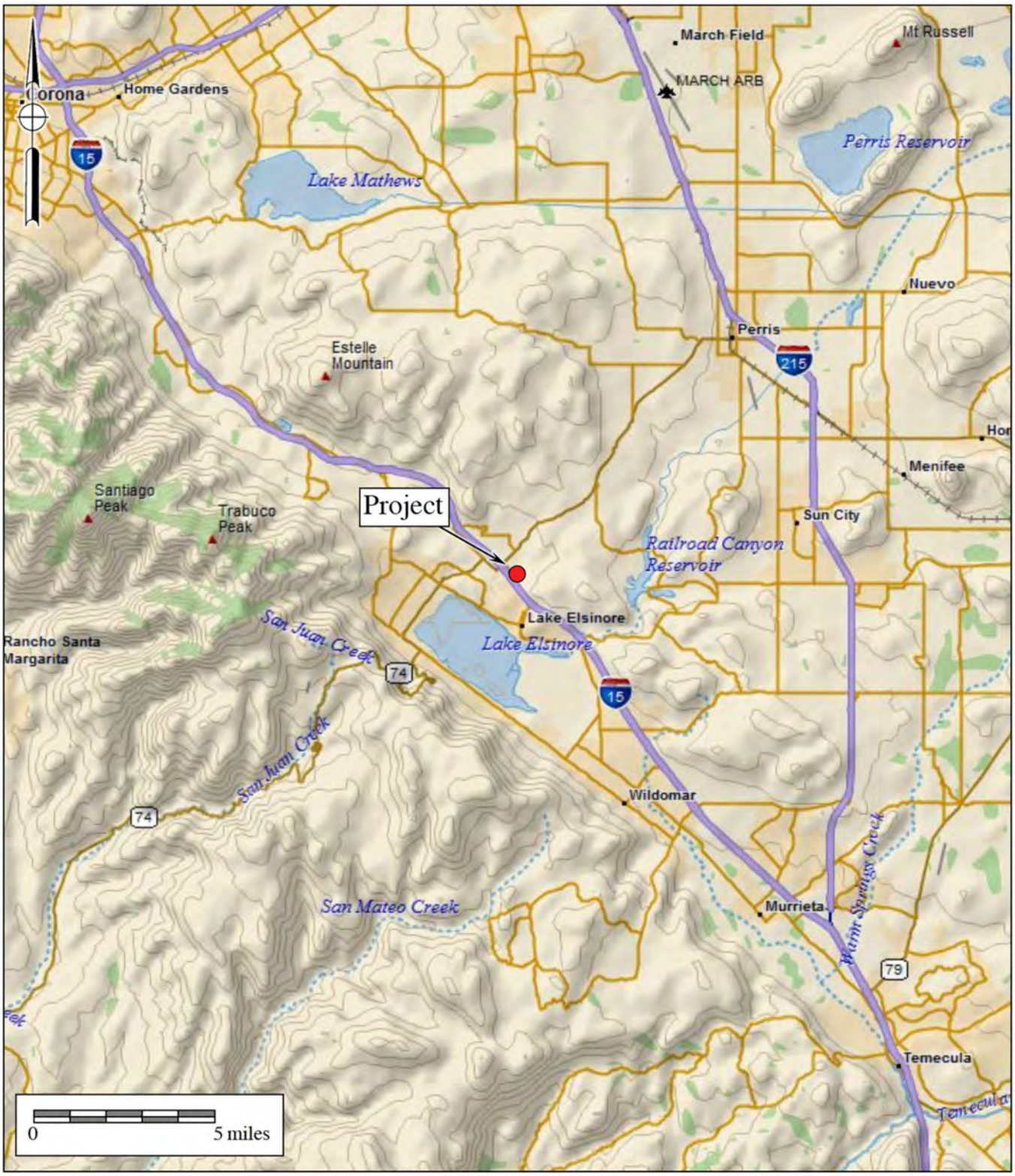

Figure 1

General Location Map

The Dexter Village Project

DeLorme (1:250,000)

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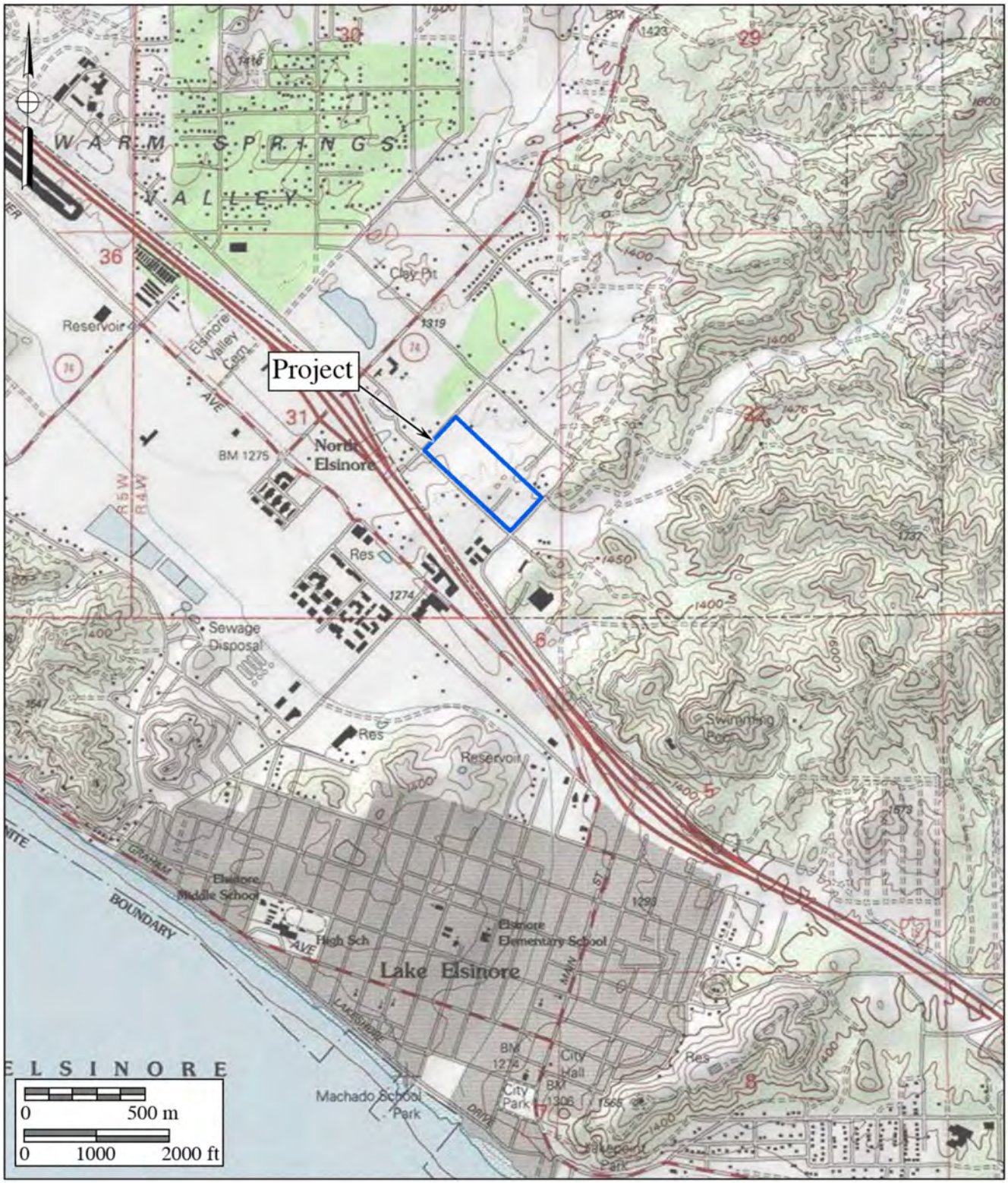

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Figure 2

Project Location Map

The Dexter Village Project

USGS *Lake Elsinore* Quadrangle (7.5-minute series)

a) A person shall not knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature situated on public lands, except with the express permission of the public agency having jurisdiction over such lands.
b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.
c) A violation of this section is a misdemeanor.

City of Lake Elsinore

Paleontological resources are outlined in Chapter 4.6.7 of the City of Lake Elsinore General Plan, which was adopted on December 13, 2011 (City of Lake Elsinore 2011a). Mapped geologic areas are delineated in the General Plan according to their potential to yield fossils and are presented as Figure 4.6, "Paleontological Resources." This figure is copied from the County of Riverside's interactive, online paleontological sensitivity mapping database and borrows the paleontological sensitivity rating system applied to geologic formations (County of Riverside 2022).

Goal 8 of the General Plan, "Preserve paleontological resources occurring within the City," states the following:

> … development in areas delineated as "High" or "Undetermined" potential sensitivity for paleontological resources [as shown on General Plan Figure 4.6], require the project applicant to hire a certified paleontologist, who must perform a literature search and/or survey and apply the relevant treatment for the site as recommended by the Society for Vertebrate Paleontology. (City of Lake Elsinore 2011a:4-63)

The City of Lake Elsinore Community Development Department will conduct an environmental review of a project and implement appropriate paleontological mitigation procedures, if necessary, prior to the project's approval.

The City of Lake Elsinore General Plan Update (City of Lake Elsinore 2011b) presents the City Paleontological Resource Map as Figure 3.2–3 and further defines paleontological sensitivity ratings, as applied to geological formations, using definitions from the County of Riverside sensitivity system as a baseline reference (City of Lake Elsinore 2011b:3.2-23). Paleontological goals, policies, and implementation programs stated in the General Plan Update are unchanged from those stated in the General Plan.

III. GEOLOGY

The project lies within the Elsinore Fault Zone, which is locally comprised of several active fault segments (Weber 1977; Morton and Weber 2003). The Elsinore Fault Zone forms a complex series of pull-apart basins, the largest and most pronounced of which forms a flat-floored, closed depression called La Laguna, which Lake Elsinore partly fills (Figure 3, after Morton and Weber 2003). As shown on Figure 3, the majority of the project is underlain by Holocene and late Pleistocene-aged young alluvial-fan deposits that are composed of unconsolidated sandy alluvium (light yellow areas labeled "Qyf_a" on Figure 3). The eastern portion of the project is mapped as Mesozoic-aged black phyllite, a fissile metamorphic rock (green areas labeled "Mzp"). The project's southern tip encompasses Holocene and late Pleistocene young alluvial channel deposits (tan areas labeled "Qya_a") deposited by an ephemeral stream. Nearby to the north of the project is an outcrop of the fossiliferous, Paleocene-aged Silverado Formation, composed of marine siltstones and sandstones (brown areas labeled "Tsl"). Most of the hilly terrain surrounding the project is composed of various plutonic and metamorphic rocks.

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age (Society of Vertebrate Paleontology 2010), but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered nonrenewable resources under state and local guidelines (see Section II of this report).

Fossil Locality Search

A paleontological literature review and a collections and locality records search were conducted for the project using records obtained for prior projects at BFSA Environmental Services, a Perennial Company (BFSA) (formerly Brian F. Smith and Associates, Inc.); from the Division of Geological Sciences at the San Bernardino County Museum; the Los Angeles County Museum of Natural History (LACM); the Western Science Center (WSC); and data from published and unpublished paleontological literature (Jefferson 1991, 2009). The resulting locality records search did not identify any previously recorded fossil localities from within the boundaries of the project nor from within several miles of the project. The closest-known fossil locality to the project is approximately two miles to the southeast in the vicinity of the San Jacinto River outlet, which consists of the remains of a Pleistocene camel in ancient lacustrine deposits (LACM locality no. 6059).

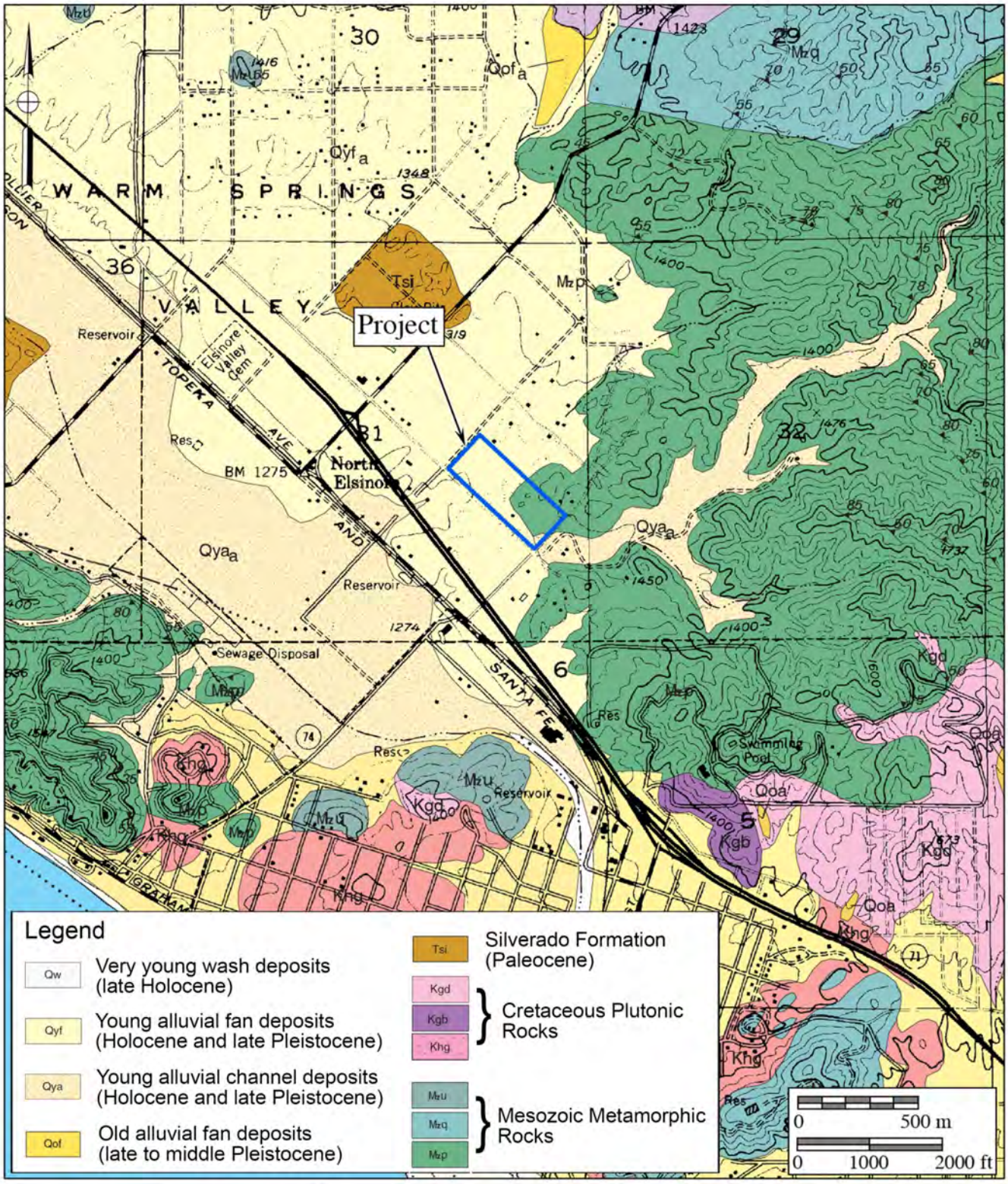

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Figure 3

Geologic Map

The Dexter Village Project

Geology after Morton and Weber (2003)

Along Cereal Street, about three miles to the south of the project, species of late Pleistocene freshwater gastropods (snails), a few of which are extinct in the region, were discovered (Rugh 2022). Associated with the gastropods were bones of several large and small Pleistocene mammals, including mammoth (*Mammuthus columbi*), large camel (*Camelops hesperus*), dwarf antelope (*Capromeryx* sp.), mule deer (*Odocoileus hemionus*), and bison (*Bison* sp.). The small mammal fauna is typical of late "Rancholarean" fossil assemblages of western Riverside County, including shrews, rabbits, ground squirrels, gophers, kangaroo rats, multiple species of mice and rats, porcupines, and weasels. Other vertebrates include the three-spined stickleback (a fish), frogs, snakes, lizards, ducks, and geese. These specimens are deposited at the WSC (N.S. Rugh, personal communication, 2022).

Outcrops of the Silverado Formation in Temescal Valley are known to yield fossils. A few miles northwest of the current project, the presence of fossil marine mollusks and plant remains in the southernmost portion of the *Lake Mathews* USGS quadrangle have been recorded (Engel 1959). Samples of fossil pollen collected from the Silverado Formation in the Alberhill area indicate a late Paleocene age for the formation, about 56 to 59 million years old (Gaponoff 1984).

Project Survey

BFSA staff, under the supervision of Principal Investigator Todd A. Wirths, conducted a project survey on May 5, 2022. The paleontological survey of the property was an intensive reconnaissance consisting of a series of parallel survey transects spaced at approximately 10-meter intervals that covered the entirety of the project. A survey form, field notes, and photographs documented the survey work undertaken. The property is located within an area of low rolling hills. The entire property appears to have been previously disked. During the survey, BFSA staff carefully inspected all exposed ground surfaces for paleontological resources, including rodent burrows and disturbed areas. No paleontological resources, or evidence indicating the presence of paleontological resources, were identified as a result of the survey.

V. PALEONTOLOGICAL SENSITIVITY

Overview

The degree of paleontological sensitivity of any particular area is based upon several factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to the accumulation of organic remains that might have become fossilized over time. Holocene alluvium is generally considered to be geologically too young to contain significant, nonrenewable paleontological resources (*i.e.*, fossils), and is therefore typically assigned a low paleontological sensitivity. Pleistocene (greater than 11,700 years old) alluvial and alluvial-fan deposits in the Inland Empire, however, often yield important Ice Age terrestrial vertebrate fossils, such as extinct mammoths, mastodons, giant ground sloths, extinct species of

horse, bison, camel, saber-toothed cats, and others (Jefferson 1991). These Pleistocene sediments are therefore accorded a high paleontological resource sensitivity. Notably, the Diamond Valley Lake fauna, a large vertebrate fossil assemblage located about 13 miles east of the project at what is now Diamond Valley Lake, represents a trove of late Pleistocene animal remains buried partly in lacustrine (lake) deposits (Springer et al. 2009), which is a similar environmental setting to Lake Elsinore today. The assemblage includes thousands of bones from dozens of vertebrates, including the bones from large individuals of mastodon, three species of giant ground sloth, and a wealth of pulmonate (land and freshwater) snails and paleobotanical materials.

Professional Standards

The Society of Vertebrate Paleontology (2010) has drafted guidelines that include four categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as listed below:

- *High Potential:* Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- *Undetermined Potential:* Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment, and that further study is needed to determine the potential of the rock unit.
- *Low Potential:* Rock units that are poorly represented by fossil specimens in institutional collections or based on a general scientific consensus that fossils are only preserved in rare circumstances.
- *No Potential:* Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

Using these criteria, based on the ages of the geologic formations mapped at the project, the fossil record of the formations, and the distribution of nearby fossil localities, the alluvial deposits at the project can be considered to have a low to undetermined paleontological resource potential. The Mesozoic phyllite has no potential for fossils.

Paleontological Sensitivity Assessment

The City of Lake Elsinore General Plan has assigned levels of paleontological sensitivity to geologic formations mapped within the city limits (City of Lake Elsinore 2011a). Formations mapped as Holocene to late Pleistocene-aged alluvium, such as those at the project, are indicated as having a Low sensitivity, while formations such as the fossil-bearing Silverado Formation are assigned a High sensitivity. Metamorphic rocks, such as the black phyllite mapped at the project, are assigned no potential, based on the small chance of fossils preserved in some rock types of this suite.

The Environmental Impact Report for the General Plan Update defines areas assigned a Low sensitivity as:

> This category encompasses lands for which previous field surveys and documentation demonstrates as having a low potential for containing significant paleontological resources subject to adverse impacts. The mapping of low potential was determined based on actual documentation, and was not generalized to cover all areas of a particular rock unit on a geologic map. For instance, an area mapped as "Qal" may actually be a thin surficial layer of non-fossiliferous sediments which covers fossil-rich Pleistocene sediments. Also, an area mapped as granite may be covered by a Pleistocene soil horizon that contains fossils. Thus, actual sensitivity must be ultimately determined by both a records search and a field inspection by a paleontologist, and those areas designated as having a low potential include those for which field inspections have been completed. (City of Lake Elsinore 2011b: 3.2-23)

The Environmental Impact Report for the General Plan Update defines areas assigned an Undetermined potential as:

> Areas underlain by sedimentary rocks for which literature and unpublished studies are not available have undetermined potential for containing significant paleontological resources. These areas need to be inspected by a qualified vertebrate paleontologist before a specific determination of high potential or low potential for containing significant non-renewable paleontological resources can be made. (City of Lake Elsinore 2011b: 3.2-23)

VI. CONCLUSIONS AND RECOMMENDATIONS

Research has confirmed the existence of sandy Holocene to late Pleistocene alluvial-fan deposits ("Qyf_a" on Figure 3) at the project. The surficial Holocene-aged portions covering the project are too young to yield fossils; therefore, paleontological monitoring of these deposits is not recommended. However, older deposits of Pleistocene-aged sediments underlie the Holocene surficial deposits at an unknown depth. These older Pleistocene sediments have a potential to yield significant paleontological resources. The occurrence of terrestrial vertebrate fossils at shallow depths from Pleistocene alluvial-fan sediments across western Riverside County is well documented. Part-time monitoring starting at a depth of five feet below the surface is recommended. If significant fossils are discovered at any time, full-time monitoring is warranted.

Similarly, the project paleontologist shall have the discretion of increasing or decreasing the timing of monitoring based on the observed geologic conditions during grading activities. The metamorphic rocks mapped at the eastern portion of the project, as indicated in green on Figure 3, will not yield fossils and, therefore, will not require monitoring. Furthermore, monitoring of any disturbed deposits or artificial fill that may be present at the project is not warranted.

Based on the conclusions and recommendations outlined above, a Paleontological Resources Impact Mitigation Program (PRIMP) is recommended prior to approval of the grading permit. A suggested PRIMP is outlined below. When implemented with the provisions of CEQA, the City of Lake Elsinore (2011a, 2011b), and the guidelines of the Society of Vertebrate Paleontology (2010), this PRIMP would mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources (fossils), if present, to a level below significant:

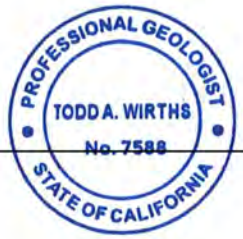
1. Monitoring of mass grading and excavation activities shall be performed by a qualified paleontologist or paleontological monitor. Starting at a depth of five feet, monitoring will be conducted part-time in areas of grading or excavation in undisturbed alluvial sediments. The exact timing of monitoring should be outlined in the PRIMP. Monitoring of metamorphic rocks mapped at the project is not recommended. The project paleontologist shall have the discretion of increasing or decreasing the timing of monitoring based on the geologic conditions observed during grading activities.
2. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays. The monitor must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens in a timely manner. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface or, if present, are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources. The monitor shall notify the project paleontologist, who will then notify the concerned parties of the discovery.
3. Paleontological salvage during trenching and boring activities is typically from the generated spoils and does not delay the trenching or drilling activities. Fossils will be collected and placed in cardboard flats or plastic buckets and identified by field number, collector, and date collected. Notes will be taken on the map location and stratigraphy of the site, which is photographed before it is vacated and the fossils are moved to a safe place. On mass grading projects, discovered fossil sites are protected by flagging to prevent them from being overrun by earthmovers (scrapers) before salvage begins. Fossils will be collected in a similar manner, with notes and photographs being taken before removing the fossils. Precise location of the site is determined with the use of handheld global positioning system (GPS) units. If the site involves remains from a large terrestrial vertebrate, such as large bone(s) or a mammoth tusk, that is/are too large to be easily removed by a single monitor, a fossil recovery crew shall excavate around the find, encase the find within a plaster and burlap jacket, and remove it after the plaster is set. For large fossils, use of the contractor's construction equipment may be solicited to help move the jacket to a safe location.
4. Isolated fossils will be collected by hand, wrapped in paper, and placed in temporary collecting flats or five-gallon buckets. Notes will be taken on the map location and

stratigraphy of the site, which is photographed before it is vacated and the fossils are moved to a safe place.

5. Particularly small invertebrate fossils typically represent multiple specimens of a limited number of organisms, and a scientifically suitable sample can be obtained from one to several five-gallon buckets of fossiliferous sediment. If it is possible to dry screen the sediment in the field, a concentrated sample may consist of one or two buckets of material. For vertebrate fossils, the test is used to observe the presence of small pieces of bones within the sediments. If present, multiple five-gallon buckets of sediment can be collected and returned to a separate facility to wet-screen the sediment.
6. In accordance with the "Microfossil Salvage" section of the Society of Vertebrate Paleontology guidelines (2010:7), bulk sampling and screening of fine-grained sedimentary deposits (including carbonate-rich paleosols) must be performed if the deposits are identified to possess indications of producing fossil "microvertebrates" to test the feasibility of the deposit to yield fossil bones and teeth.
7. In the laboratory, individual fossils will be cleaned of extraneous matrix, any breaks will be repaired, and the specimen, if needed, will be stabilized by soaking in an archivally approved acrylic hardener (*e.g.*, a solution of acetone and Paraloid B-72).
8. Recovered specimens will be prepared to a point of identification and permanent preservation (not display), including screen washing sediments to recover small invertebrates and vertebrates. Preparation of individual vertebrate fossils is often more time-consuming than accumulations of invertebrate fossils.
9. Recovered specimens will be identified and curated into a professional, accredited public museum repository with a commitment to archival conservation and permanent retrievable storage (*e.g.*, the WSC). The paleontological program should include a written repository agreement prior to the initiation of mitigation activities. Prior to curation, the lead agency (*e.g.*, the City of Lake Elsinore) will be consulted on the repository/museum to receive the fossil material.
10. A final report of findings and significance will be prepared, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location(s). The report, when submitted to, and accepted by, the appropriate lead agency, will signify satisfactory completion of the project program to mitigate impacts to any potential nonrenewable paleontological resources (*i.e.*, fossils) that might have been lost or otherwise adversely affected without such a program in place.

VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief and have been compiled in accordance with CEQA criteria.



April 11, 2024

Todd A. Wirths
Senior Paleontologist
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Date

VIII. REFERENCES

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APPENDIX A

Qualifications of Key Personnel

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Education

Master of Science, Geological Sciences, San Diego State University, California **1995**

Bachelor of Arts, Earth Sciences, University of California, Santa Cruz **1992**

Professional Certifications

California Professional Geologist #7588, 2003
Riverside County Approved Paleontologist
San Diego County Qualified Paleontologist
Orange County Certified Paleontologist
OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

Professional Memberships

Board member, San Diego Geological Society
San Diego Association of Geologists; past President (2012) and Vice President (2011)
South Coast Geological Society
Southern California Paleontological Society

Experience

Mr. Wirths has more than a dozen years of professional experience as a senior-level paleontologist throughout southern California. He is also a certified California Professional Geologist. At BFSA, Mr. Wirths conducts on-site paleontological monitoring, trains and supervises junior staff, and performs all research and reporting duties for locations throughout Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego, and Imperial Counties. Mr. Wirths was formerly a senior project manager conducting environmental investigations and remediation projects for petroleum hydrocarbon-impacted sites across southern California.

Selected Recent Reports

2019 *Paleontological Assessment for the 10575 Foothill Boulevard Project, City of Rancho Cucamonga, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Assessment for the MorningStar Marguerite Project, Mission Viejo, Orange County, California.* Prepared for T&B Planning. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Monitoring Report for the Nimitz Crossing Project, City of San Diego.* Prepared for Voltaire 24, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California.* Prepared for JRT BP 1, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Oceanside Beachfront Resort Project, Oceanside, San California.* Prepared for S.D. Malkin Properties. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Nakase Project, Lake Forest, Orange County, San California.* Prepared for Glenn Lukos Associates, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, Banning, Riverside County*. Prepared for NP Banning Industrial, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Ortega Plaza Project, Lake Elsinore, Riverside County*. Prepared for Empire Design Group. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Record Search Update for the Green River Ranch III Project, Green River Ranch Specific Plan SP00-001, City of Corona, California*. Prepared for Western Realco. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Cypress/Slover Industrial Center Project, City of Fontana, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Imperial Landfill Expansion Project (Phase VI, Segment C-2), Imperial County, California*. Prepared for Republic Services, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

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2021 *Paleontological Resource Impact Mitigation Program for the Del Oro (Tract 36852) Project, Menifee, Riverside County*. Prepared for D.R. Horton. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

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